

KAIST IP US LLC

v.

Samsung Electronics Co., LTD., et al.,

Defendants' Motion for JMOL on Non-Infringement (Dkt. 578)

July 25, 2019

'055 Patent, Independent Claims

'055 PATENT, CLAIM 1

1. A double-gate FinFET device, comprising:
a bulk silicon substrate;
a Fin active region which is a wall-shape single crystalline silicon on a surface of the bulk silicon substrate and connected to said bulk silicon substrate;
a second oxide layer which is formed up to a certain height of the Fin active region from the surface of bulk silicon substrate;
a gate oxide layer which is formed on both side-walls of the Fin active region protruded from said second oxide layer;
a first oxide layer which is formed on the upper surface of said Fin active region with a thickness greater or equal to that of the gate oxide;
a gate which is formed on said first and second oxide layer;
a source/drain region which is formed on both sides of the Fin active region except where said gate overlaps with the Fin active region; and
a contact region and a metal layer which are formed at said source/drain and gate contact region,
wherein the thickness of said gate oxide layer is between 0.5 nm and 10 nm, and the thickness of said first oxidation layer is between 0.5 nm and 200 nm.

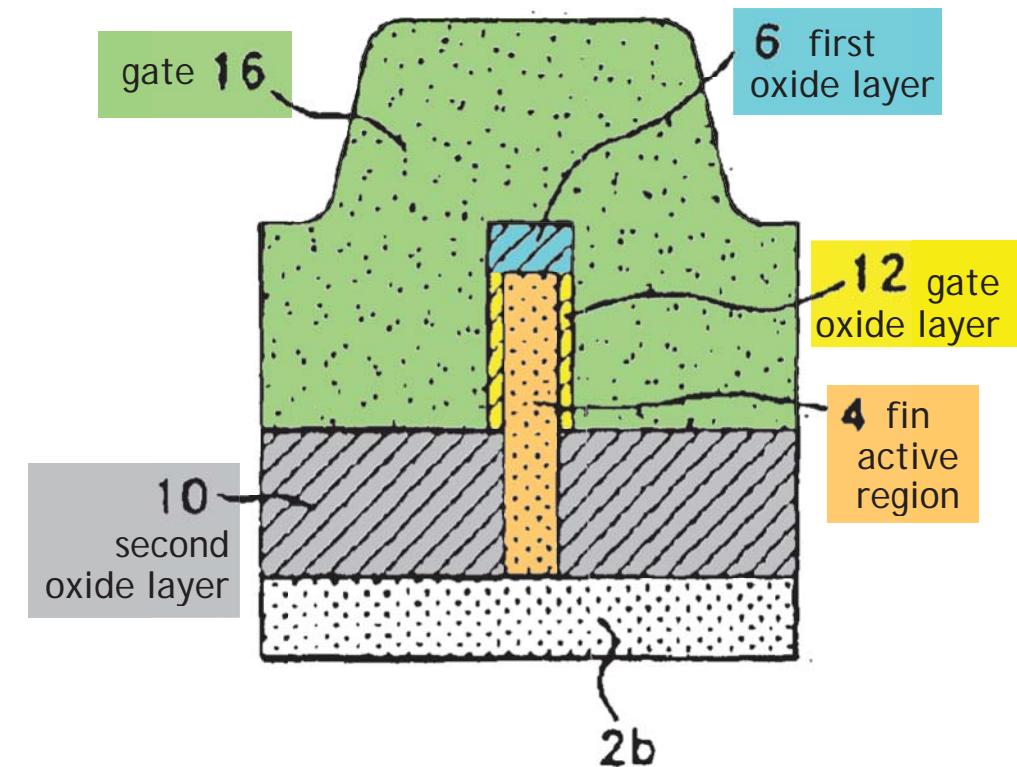
'055 PATENT, CLAIM 13

13. A double-gate FinFET device, comprising:
a bulk silicon substrate;
a Fin active region which is a wall-shape single crystalline silicon on a surface of the bulk silicon substrate and connected to said bulk silicon substrate;
a second oxide layer which is formed up to a certain height of the Fin active region from the surface of bulk silicon substrate;
a gate oxide layer which is formed on both side-walls of the Fin active region protruded from said second oxide layer;
a first oxide layer which is formed on the upper surface of said Fin active region with a thickness greater or equal to that of the gate oxide;
a gate which is formed on said first and second oxide layer;
a source/drain region which is formed on both sides of the Fin active region except where said gate overlaps with the Fin active region; and
a contact region and a metal layer which are formed at said source/drain and gate contact region,
wherein the resistance of said Fin active region is reduced by enlarging the width of said Fin active region within the oxidation layer as it approaches the bulk silicon substrate.

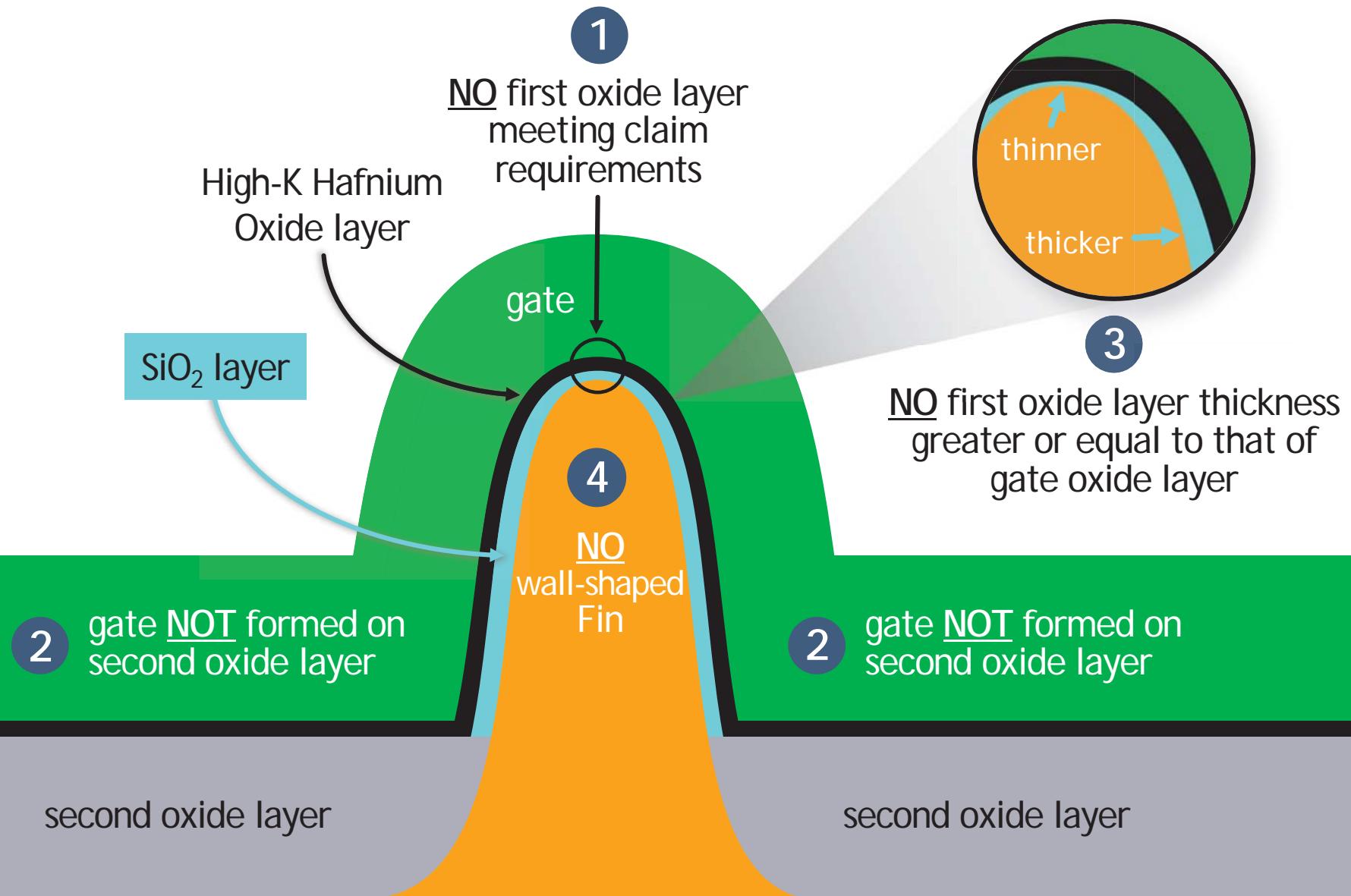
'055 Patent, Claim 1

'055 PATENT, CLAIM 1

1. A double-gate FinFET device, comprising:
 - a bulk silicon substrate;
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 - a second oxide layer which is formed up to a certain height of the Fin active region from the surface of bulk silicon substrate;
 - a gate oxide layer which is formed on both side-walls of the Fin active region protruded from said second oxide layer;
 - a first oxide layer which is formed on the upper surface of said Fin active region with a thickness greater or equal to that of the gate oxide;
 - a gate which is formed on said first and second oxide layer;
 - a source/drain region which is formed on both sides of the Fin active region except where said gate overlaps with the Fin active region; and
 - a contact region and a metal layer which are formed at said source/drain and gate contact region, wherein the thickness of said gate oxide layer is between 0.5 nm and 10 nm, and the thickness of said first oxidation layer is between 0.5 nm and 200 nm.

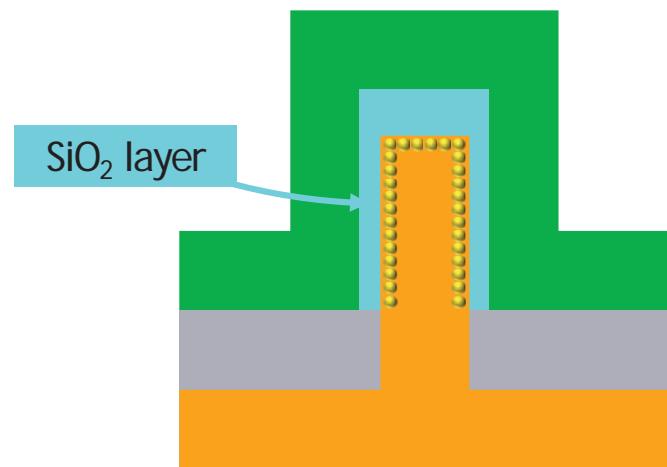


No Reasonable Jury Could Have Found Infringement

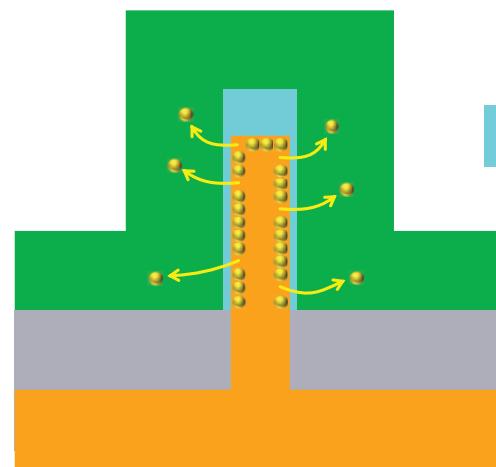


Why Accused Devices Are Different From Those Claimed In '055 Patent

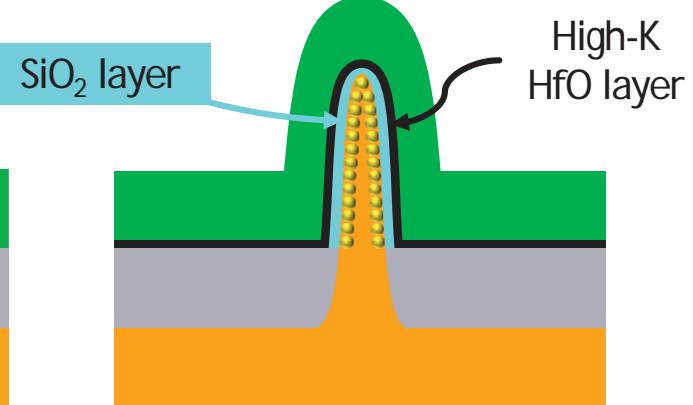
2003: 90nm
Low leakage
One Layer



2005: 65nm
High Leakage
One Layer



2007: 45nm
Low Leakage
Two Layers



- Implementation of stack of two layers enabled smaller sizes
 - SiO₂ layer alone works fine at larger sizes but leaked at smaller sizes
 - Formation of HfO layer solved the leakage problem
- Implementation of curved top Fin simplified manufacturing, and improved device operation and reliability

Move to Hafnium Oxide (HfO) Was “Groundbreaking”

Dr. Kuhn



Plaintiff's Expert

A. Gordon Moore started the place. I mean, he's very senior, very respected.

. . .

Q. So if he said in 2007 this move to High-k Hafnium oxide was groundbreaking and the biggest development in transistor technology in the past 60 years, people would have known about that, right?

A. Yes, sir.

Prof. Lee Specifically Avoided High-K (HfO)

Jong-Ho Lee



Named Inventor
of '055 Patent

Q. Why didn't you use and why didn't you and Samsung use a High-k gate oxide layer in your original devices?

A. At the time of my research, we wanted to show that we can create an advanced performance transistor structure without using High-k.

Dr. Kuhn Admits Modern High-K Gate Dielectric Stacks Are Multiple Layers

Dr. Kuhn



Plaintiff's Expert

Q. Okay. So in this section of your paper, you're talking about variations on -- on the gate, and there's a statement there that basically says: Modern High-k gate dielectric stacks are actually multilayers.

A. Yes, sir.

IEEE TRANSACTIONS ON ELECTRON DEVICES, VOL. 59, NO. 7, JULY 2012 1813

Considerations for Ultimate CMOS Scaling

Kelin J. Kuhn, *Fellow, IEEE*

Abstract—This review paper explores considerations for ultimate CMOS transistor scaling. Transistor architectures such as extremely thin silicon-on-insulator and FinFET (and related architectures such as TriGate, Omega-FET, Pi-Gate), as well as nanowire device architectures, are compared and contrasted. Key technology challenges (such as advanced gate stacks, mobility resistance, and capacitance) shared by all of the architectures will be discussed in relation to recent research results.

Index Terms—Complementary metal-oxide semiconductor (CMOS), FinFET, mobility, nanowire, silicon on insulator (SOI), strain.

Whether gate-first or gate-last, modern high-*k* gate dielectric stacks are actually multilayers, with a thin silicon oxy-nitride IL with $k \sim 4$, followed by a thicker high-*k* layer (with $k \sim 20$) and followed (in the case of gate-first) by a capping layer for effective workfunction control. In broad terms, reducing

Fig. 1. Basic components of the ultimate CMOS device.

GATE-ALL-AROUND ARCHITECTURE

Tab 4 at 1818

Dr. Kuhn Admits Samsung's High-K Gate Dielectric Stack Has Two Layers

Dr. Kuhn



Plaintiff's Expert

Q. Okay. And what's a -- what's a dielectric stack?

A. It means something similar to what we see in the Samsung device. It means you may have multiple components in the layer. Sometimes you'll hear me refer to those bilayers in my report. They're referred to that way.

Q. Okay. So when you say bilayer, you -- you actually -- that's a short form for two layers, right?

A. Two layers that act as one, yes, sir.

Q. Okay. But they are two layers, right?

A. Yes, sir, there's two components.

Dr. Kuhn Admits That Multiple Gate Dielectric Layers Are Required Today

Dr. Kuhn



Plaintiff's Expert

Q. Okay. And modern devices today, as you yourself state, include those multiple layers for gate dielectrics. You agree with that?

A. Oh, yes, sir.

Q. Right. And they need to include High-k material, don't they?

A. If it's a High-k stack, yes, sir.

Q. Right. And you need a High-k stack if you're getting down to 14 nanometers, don't you?

A. That's the general consensus, sir.

Dr. Kuhn Admits That Multiple Gate Dielectric Layers Are Required Today

Dr. Kuhn



Plaintiff's Expert

Q. All right. So if I took a device -- let's say a FinFET that has a Fin active region, has a silicon dioxide layer on top of that Fin and a gate on top of that silicon dioxide layer, try to shrink it down to 14 nanometers, I'm going to have big time leakage problems, aren't I?

A. Yes, sir.

Q. Okay. In fact, it wouldn't work?

A. It would work, but I agree, it would have leakage problems.

Q. Okay. It couldn't be commercially viable, would it?

A. No, sir.

Non-Infringement Ground 1:

Plaintiff failed to prove the accused products have the claimed “first oxide layer”

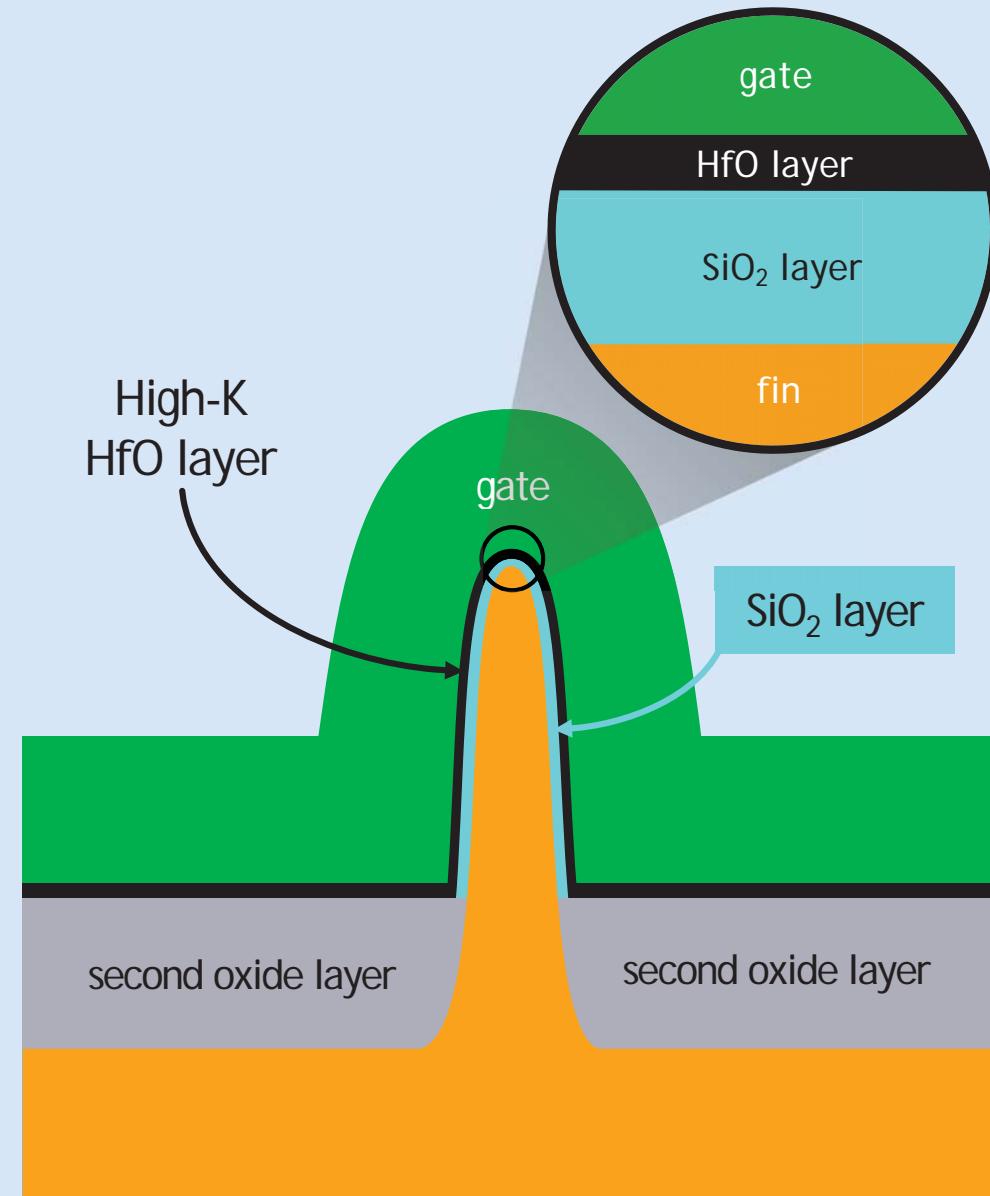
Defendants Do Not Have Claimed “first oxide layer”

CLAIMS REQUIRE

a first oxide layer which is formed on the upper surface of said Fin active region with a thickness greater or equal to that of the gate oxide;

a gate which is formed on said first and second oxide layer;

DEFENDANTS HAVE



Magistrate Judge Payne Ruled the Question For the Jury Was Whether the SiO₂ and HfO Layers Were One Layer or Two Layers

This presents a fact issue for the jury to resolve—whether the SiO₂ and HfO layers are a single layer formed on the sidewalls and upper surface of the fin active region. The answer to *that* question, in turn, relates to whether the gate is formed on the “first oxide layer” as recited by the claims. Thus, because Defendants have presented evidence from which a jury might return a verdict in their favor, Plaintiff’s Motion for Summary Judgment of Infringement [Dkt. # 228] should be **DENIED**.

The SiO_2 and HfO_2 Layers Are Formed by Different Processes

Dr. Kuhn



Plaintiff's Expert

Q. Now, the Defendants' products, these two layers, Hafnium oxide, which is formed on the silicon dioxide layer, are formed by different processes, aren't they?

A. Yes, sir.

• • •

Q. So with that clarification, you agree that the lighter-colored silicon dioxide layer is formed through a process of oxidation, right?

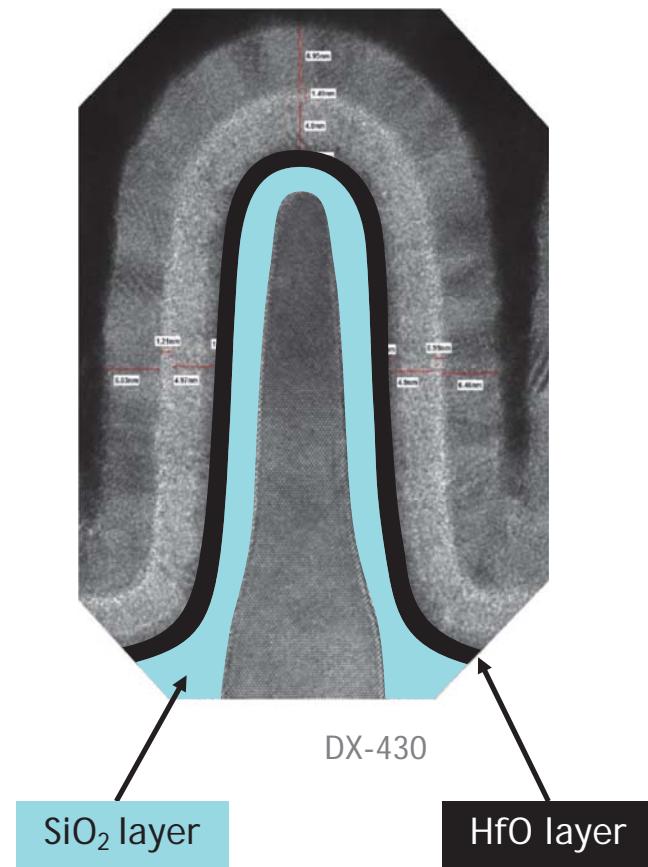
A. Yes, sir.

• • •

Q. The Hafnium oxide layer in this process is formed actually by what's known as atomic layer deposition.

You agree?

A. That's my understanding, sir.



The SiO₂ and HfO Layers Are Formed On Different Tools at Different Times

Dr. Kuhn



Plaintiff's Expert

Q. Okay. So you agree that those two layers are formed on different machines or tools, correct?

A. Yes, sir.

Q. Okay. They're formed at different times in the process, correct?

A. Yes, sir.

The SiO₂ and HfO Layers Have Different Material Properties

Dr. Kuhn



Plaintiff's Expert

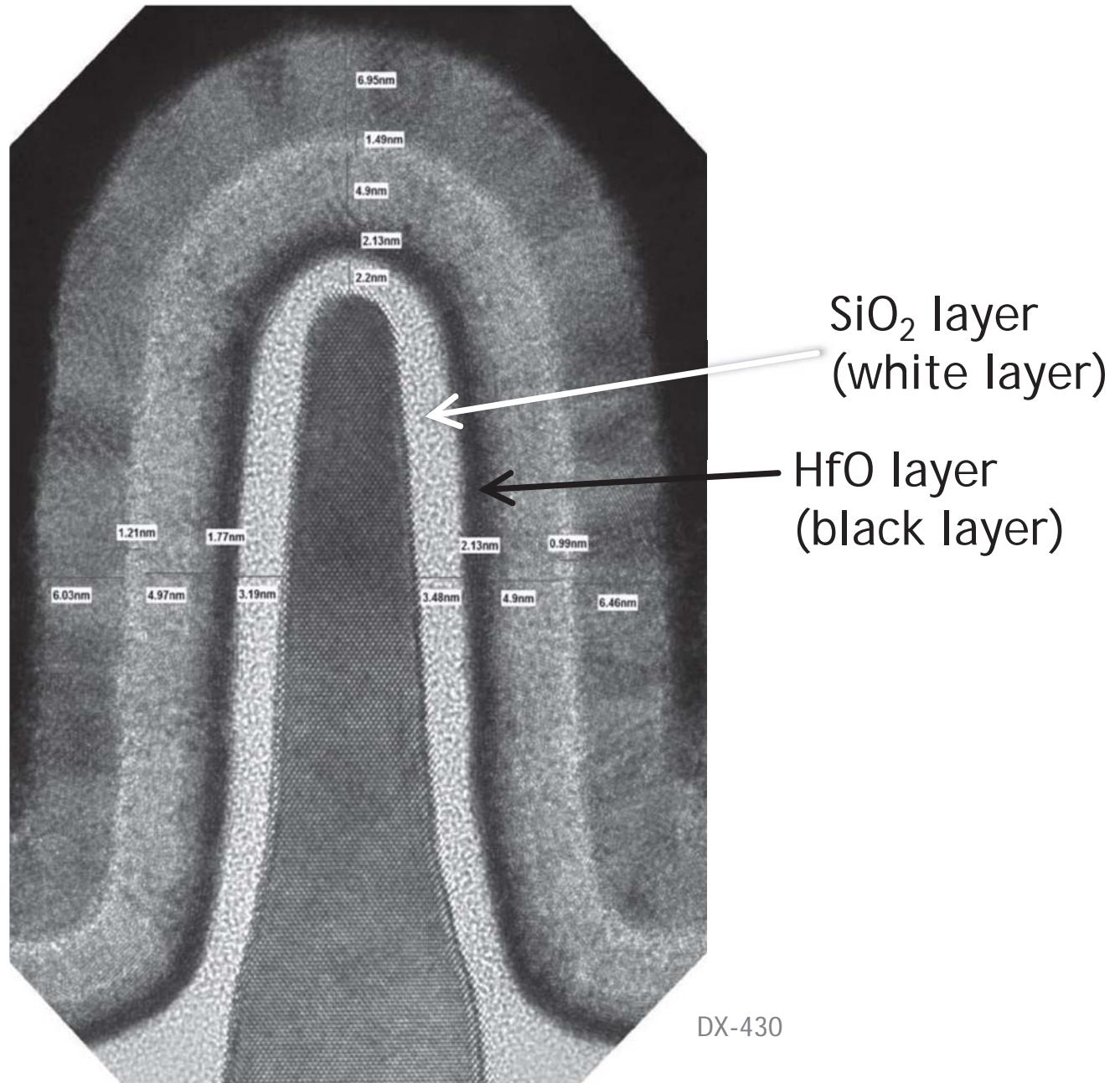
Q. Hafnium oxide is a High-k dielectric, right?

A. Yes, sir.

Q. And it has a higher dielectric constant than the silicon dioxide layer; isn't that right?

A. Yes, sir.

Accused Products Have Two Layers Between the Fin and Gate



Undisputed That the SiO₂ and HfO Layers Are Two Separate Layers

Dr. Kuhn



Plaintiff's Expert

Q. Okay. But there's no question that you have described that gate oxide as a **bilayer**, right?

A. Historically.

Q. Yes?

A. Yes, sir.

Q. It is a bilayer, right, **it's two layers?**

A. **It is fabricated as two layers**, you can describe it as a bilayer, yes, sir.

Q. **All right. It is -- it's certainly two separate layers**
separate processes, separate properties, separate
times and --

A. **I -- I agree with that, sir.**

Q. **All right. That's just undisputed?**

A. **I agree with that, sir.**

Dr. Kuhn Conceded the Fact Issue Identified By Magistrate Payne

Magistrate Payne	Dr. Kuhn
<p>“This presents a fact issue for the jury to resolve—<u>whether the SiO₂</u> and HfO layers are a <u>single layer</u> formed on the sidewalls and upper surface of the fin active region. The answer to <i>that</i> question, in turn, relates to whether the gate is formed on the ‘first oxide layer’ as recited by the claims.”</p>	<p>Q. All right. It is - <u>it's certainly two separate layers</u> <u>separate processes, separate properties, separate times</u> and -</p> <p>A. I - <u>I agree with that</u>, sir.</p> <p>Q. All right. <u>That's just undisputed?</u></p> <p>A. <u>I agree with that</u>, sir.</p>

Dkt. 459 at 3

Trial Testimony on 6/14/18 PM at 199:25-200:5

Dr. Kuhn's Purported Literal Infringement Opinion

Dr. Kuhn



Plaintiff's Expert

Q. Do these components, the Hafnium oxide and the silicon dioxide, do these components operate as one layer?

A. Yes, sir.

No Reasonable Jury Could Have Found the Claims Literally Infringed



"To establish literal infringement, every limitation set forth in a claim must be found in an accused product, exactly."

Southwall Techs., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1575 (Fed. Cir. 1995)

Plaintiff's Theory That a Combination of Two Layers Literally Satisfies the "first oxide layer" Limitation Fails as a Matter of Law



“‘Comprising’ means that the claim can be met by a system that contains features over and above those specifically required by the claim element, but only if the system still satisfies the specific claim-element requirements: the claim does not cover systems whose unclaimed features make the claim elements no longer satisfied.”

In re Varma, 816 F.3d 1352, 1362 (Fed. Cir. 2016) (emphasis added)



“[T]he question [of] whether ‘a’ can serve to negate what is required by the language following ‘a’: . . . It cannot. For a dog owner to have ‘a dog that rolls over and fetches sticks,’ it does not suffice that he have two dogs, each able to perform just one of the tasks.”

In re Varma, 816 F.3d at 1363

No Reasonable Jury Could Have Found the Claims Infringed Under DOE



“The evidence and argument on the doctrine of equivalents cannot merely be subsumed in plaintiff’s case of literal infringement [even when] there was evidence and argument on literal infringement, that may also bear on equivalence.”

Lear Siegler, Inc. v. Sealy Mattress Co., 873 F.2d 1422, 1425 (Fed. Cir. 1989)

No Reasonable Jury Could Have Found the Claims Infringed Under DOE



"A plaintiff must provide 'particularized testimony and linking argument to show the equivalents' are insubstantially different. 'Generalized testimony as to the overall similarity between the claims and the accused infringer's product or process will not suffice.'"

Gemalto S.A. v. HTC Corp., 754 F.3d 1364, 1374 (Fed. Cir. 2014) (citation omitted)

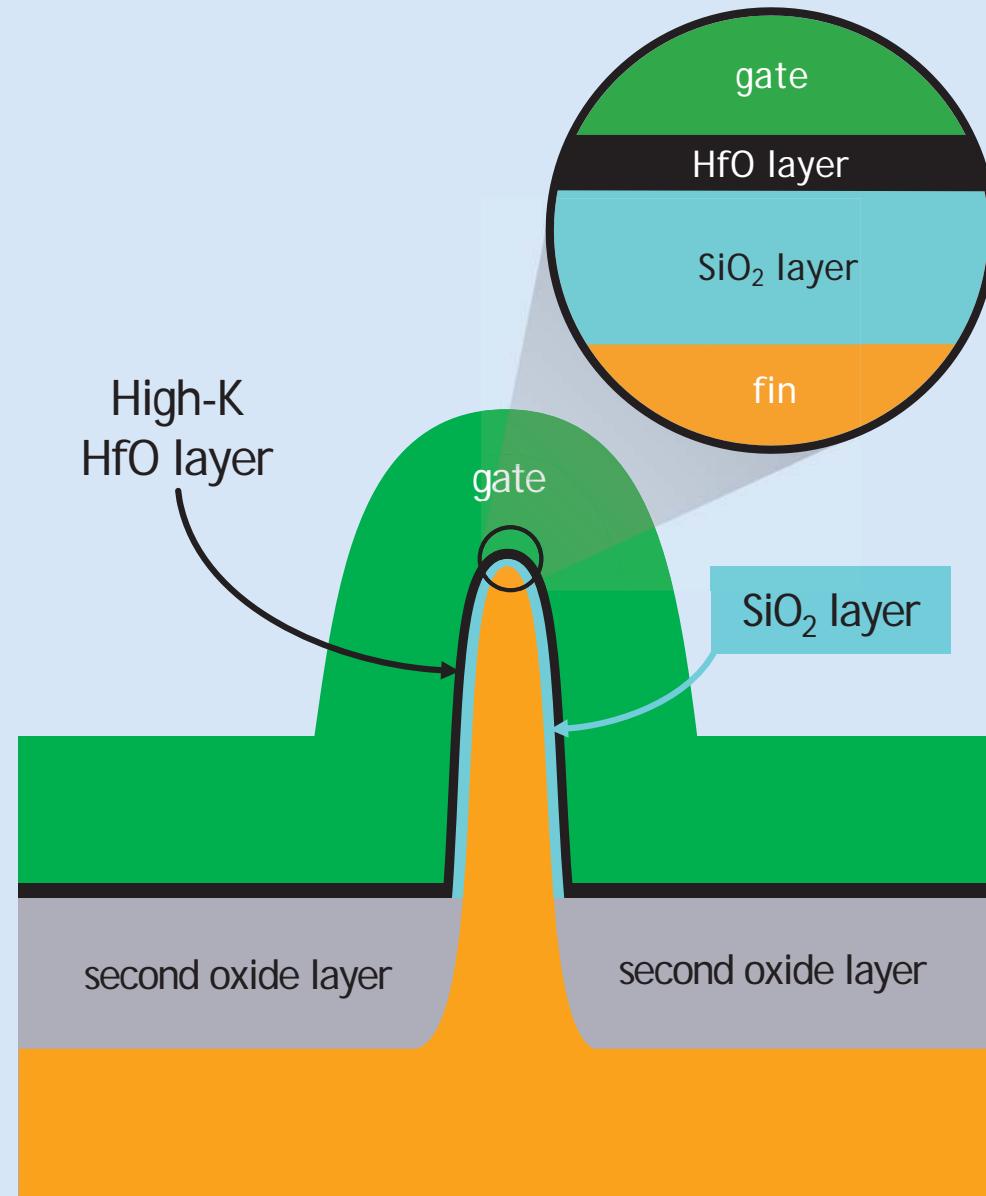
No Reasonable Jury Could Have Found Infringement

CLAIMS REQUIRE

a first oxide layer which is formed on the upper surface of said Fin active region with a thickness greater or equal to that of the gate oxide;

a gate which is formed on said first and second oxide layer;

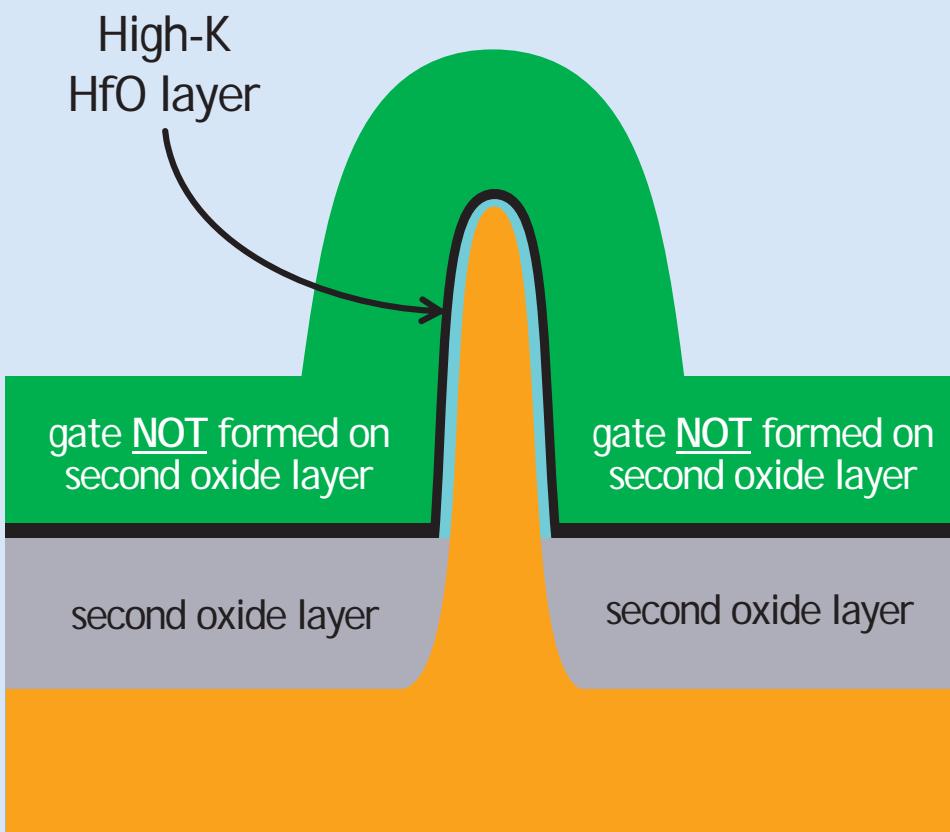
DEFENDANTS HAVE



Non-Infringement Ground 2:

Plaintiff failed to prove the accused products have
“a gate which is formed on said ... second oxide layer”

Accused "gate" Is NOT Formed On the Accused "second oxide layer"

CLAIMS REQUIRE	DEFENDANTS HAVE
<p><u>a second oxide layer</u> which is formed up to a certain height of the Fin active region from the surface of the bulk silicon substrate;</p>	
<p><u>a gate which is formed on said first and second oxide layer;</u></p>	

Dr. Kuhn Identified SiO₂ Alone As the “second oxide layer”

Dr. Kuhn



Plaintiff's Expert

Q. So, Dr. Kuhn, is -- are these elements found in the accused device?

A. Yes. And I show here some internal Samsung documents. [referring to PX-0853]

...

And the picture does illustrate **the second oxide layer formed up to a certain height** and the dimensions of that layer.

Q. And **what is the second oxide layer made up of in the Samsung device, what's the material?**

A. **Silicon dioxide.**

...

Q. Now, what's the next element that you had -- what was your conclusion on this -- your final conclusion on this element?

A. My conclusion on this element is the Defendants' devices have this element, and I've checked it off and turned it green.

Dr. Kuhn Identified SiO_2 Alone As the “second oxide layer”

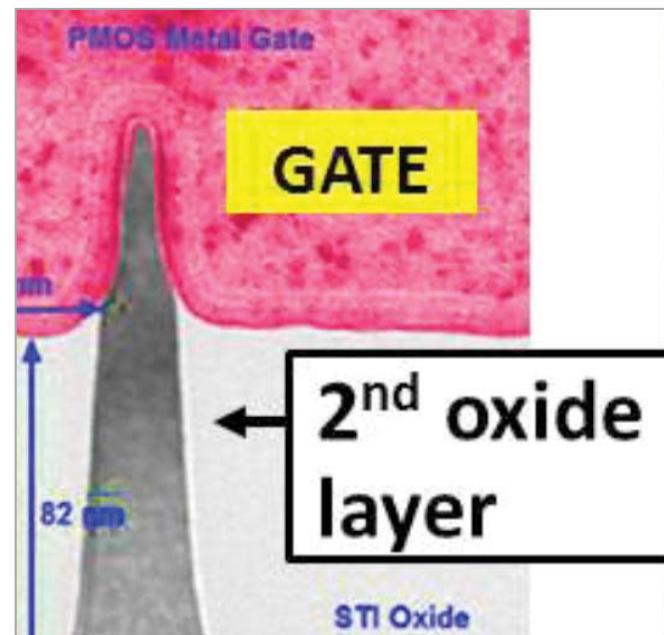
Dr. Kuhn



Plaintiff's Expert

Q. And what about TEM images, do they confirm this element, as well?

A. Yes. I'd like to point out Document PX-0373. And in PX-0373 I've indicated the gate in pink so it matches the model. And you can see the gate here, and it's wrapping around Fin active region, so it's on the first oxide layer which is on the top and the second oxide layer which is over there on the side.



Kuhn Dem. at 89 (Kuhn annotating PX-0373)

STI Oxide (SiO_2)

PX-0373.59

Defendants' Gate Is Formed on a HfO Layer—Not the SiO₂ Layer

Dr. Subramanian



Defendants' Expert

Q. Okay. And can you show us where the Hafnium oxide fits in?

A. Yes. The Hafnium oxide is deposited after the silicon dioxide has been grown. So -- and because it is deposited, it is both over and around the silicon dioxide and also spreads to the sides over what in Dr. Kuhn's model would be the second oxide layers.

Q. Okay. And then where does the gate come in?

A. The gate is then deposited over the structure, so it will be over the Hafnium oxide, both in the regions above the Fin and in the region above the sides.

Defendants' Gate Is Not Formed On the SiO₂ Layer

Dr. Wallace



Defendants'
Oxidation Expert

Q. And now where would the gate itself go on this structure?

A. So that's going to be on the outside of the Hafnium oxide layer. Beyond that would be these regions here. We can see that they are in contact with the black Hafnium oxide layer, and they also surround the body of the Fin.

Q. Okay. So does that gate ever come in contact with the silicon dioxide layer?

A. I don't believe so. I believe that the images I've seen, the Hafnium oxide is basically between that gate and the silicon oxide on the surface.

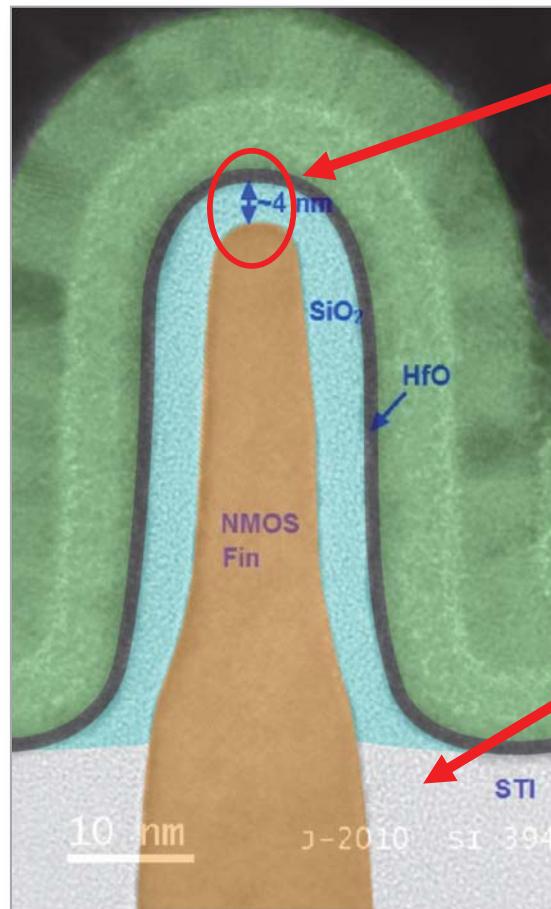
Dr. Kuhn Addressed the HfO Layer for the “first oxide layer”
But Not for the “second oxide layer”

“a gate which is formed on said first and second oxide layer”

Dr. Kuhn



Plaintiff's Expert



Alleged “first oxide layer”

“[W]e have a combination of a Hafnium dioxide layer and a silicon dioxide layer, and those two layers make up the first oxide layer on the top . . .”

Alleged “second oxide layer”

Only identified the silicon dioxide layer

STI (SiO₂)

See PX-0373.59

Dr. Kuhn's Only Explanation Was That "there's nothing in the claims that says that the gate is directly on an SiO₂ layer"

Dr. Kuhn



Plaintiff's Expert

- Q. And is there anything in the claims that require the gate to be directly on the SiO₂ layer?
- A. No, sir, there's nothing in the claims that says that the gate is directly on an SiO₂ layer.
- Q. And so what's your conclusion with respect to that element?
- A. With respect to this element, my conclusion is there is a gate which is formed on the first and second oxide layer, and I'm going to check that off.

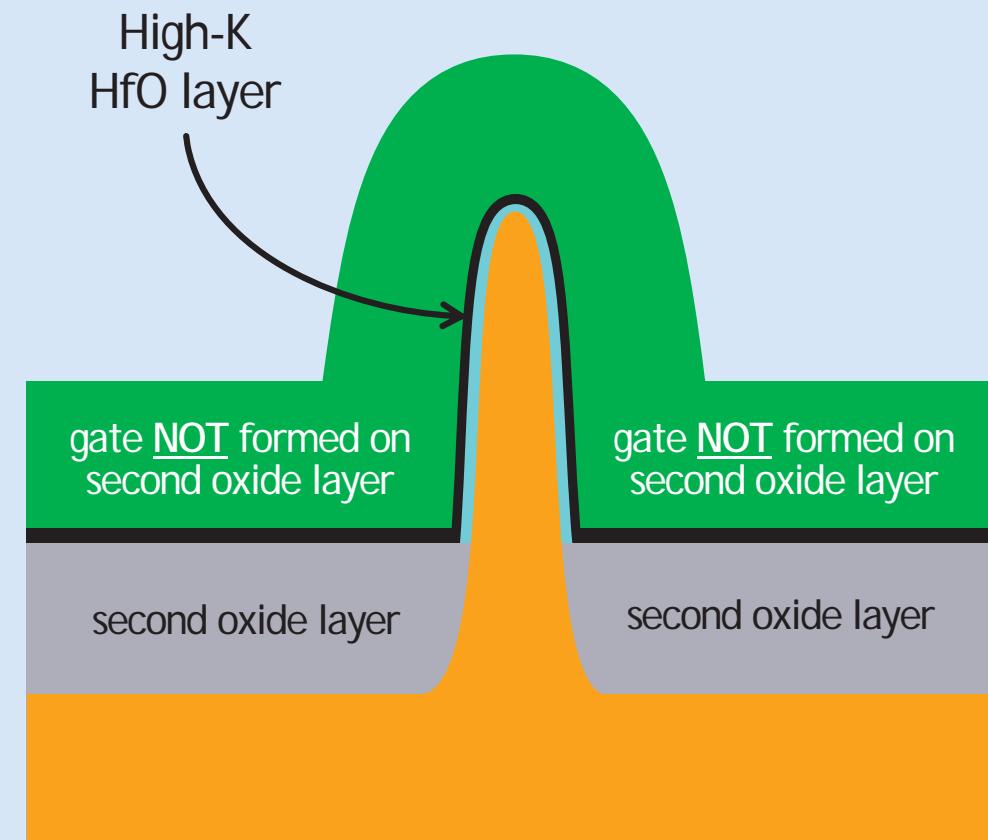
No Reasonable Jury Could Have Found Infringement

CLAIMS REQUIRE

a second oxide layer which is formed up to a certain height of the Fin active region from the surface of the bulk silicon substrate;

a gate which is formed on said first and second oxide layer;

DEFENDANTS HAVE



Non-Infringement Ground 3:

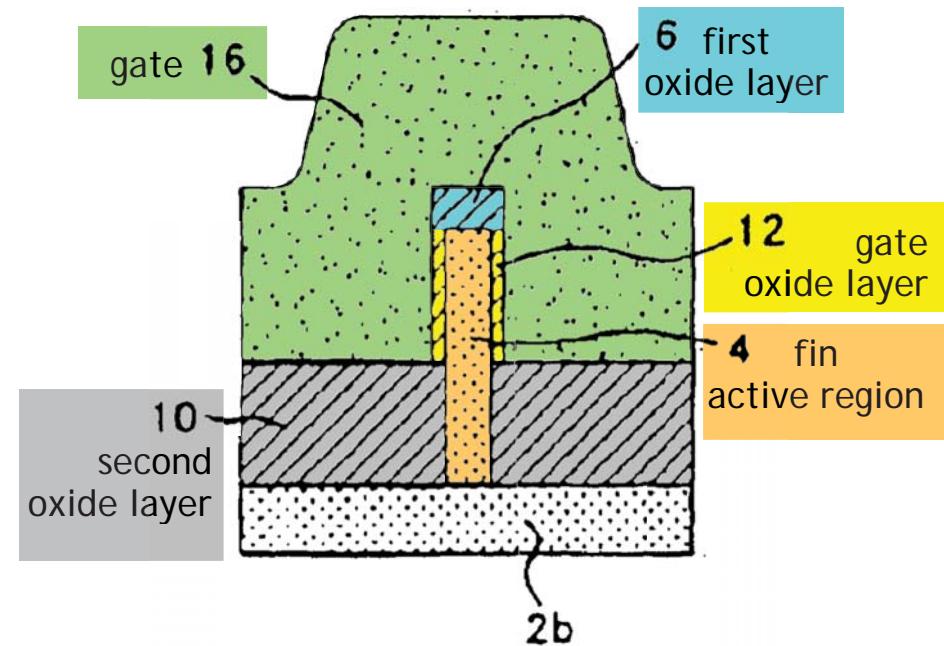
Plaintiff failed to prove the accused products have
“a first oxide layer ... thickness greater or equal to that
of the gate oxide”

All Claims Require a “first oxide layer ... thickness greater or equal to that of the gate oxide”

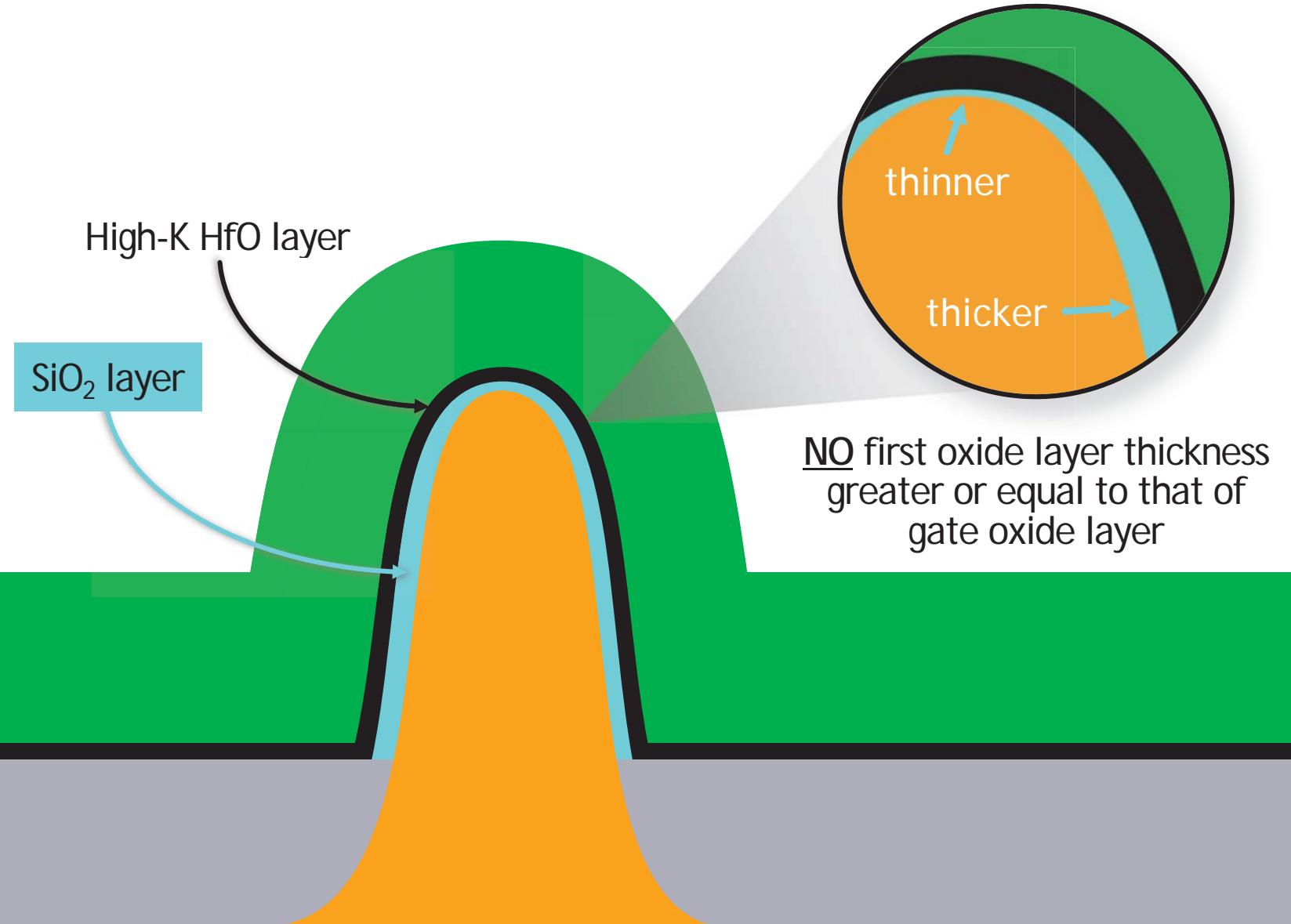
“Thickness Greater or Equal”

a gate oxide layer which is formed on both side-walls of the Fin active region protruded from said second oxide layer;

a first oxide layer which is formed on the upper surface of said Fin active region with a thickness greater or equal to that of the gate oxide;



Accused “first oxide layer” Does Not Have Required “thickness”

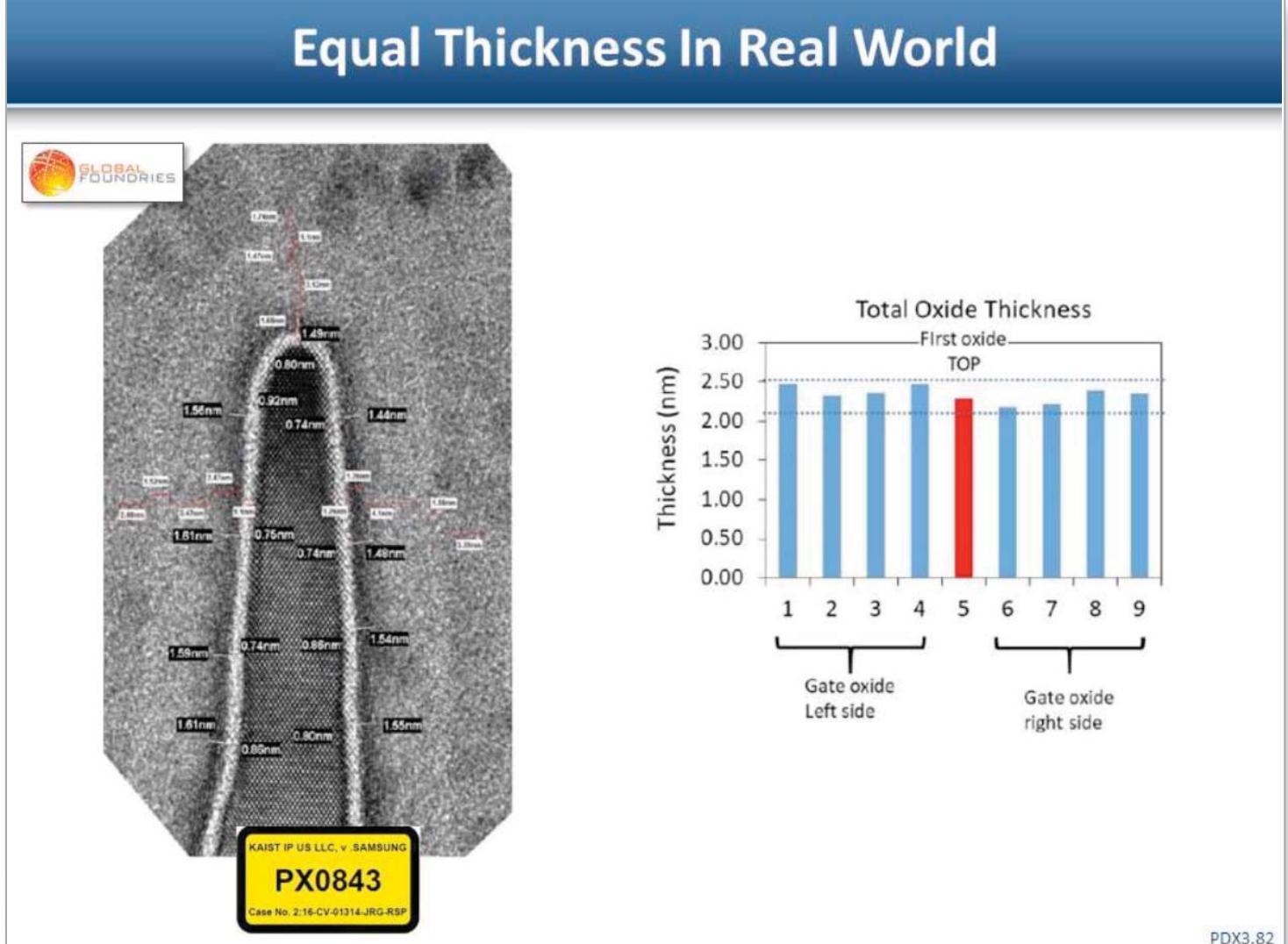


Plaintiff's Own Evidence Shows Accused "first oxide layer" Thickness Is Less Than That of the Accused "gate oxide layer"

Dr. Kuhn



Plaintiff's Expert

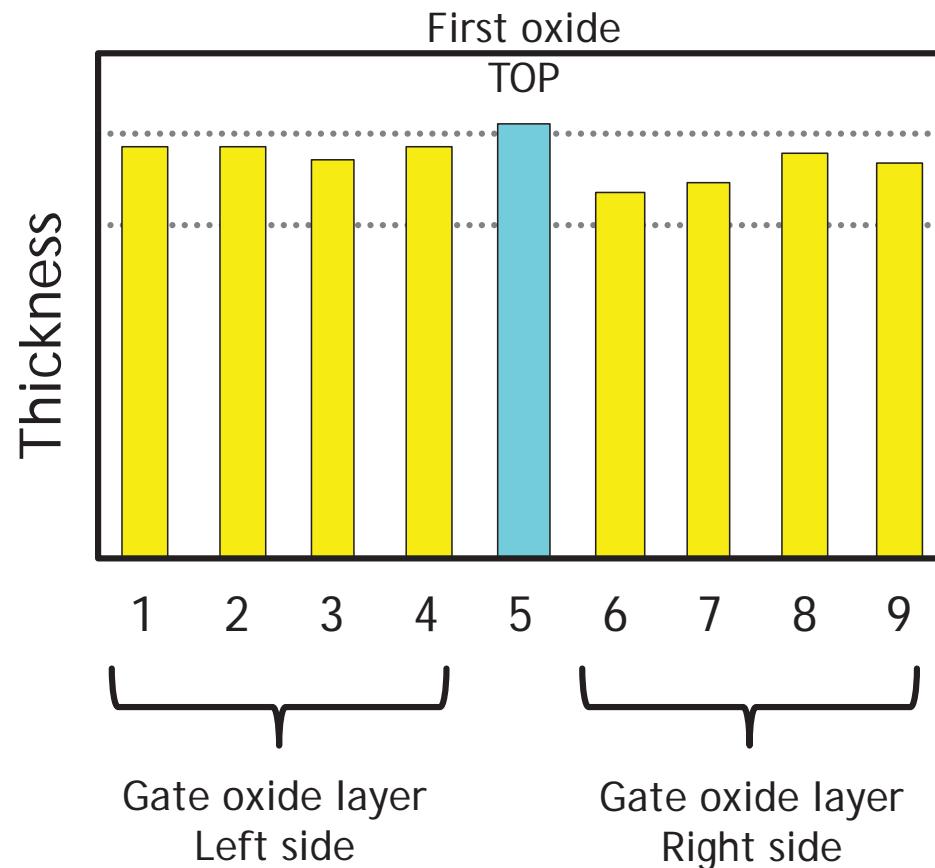


See Trial Testimony on 6/12/18 Sealed AM at 18:5-14

All Claims Require

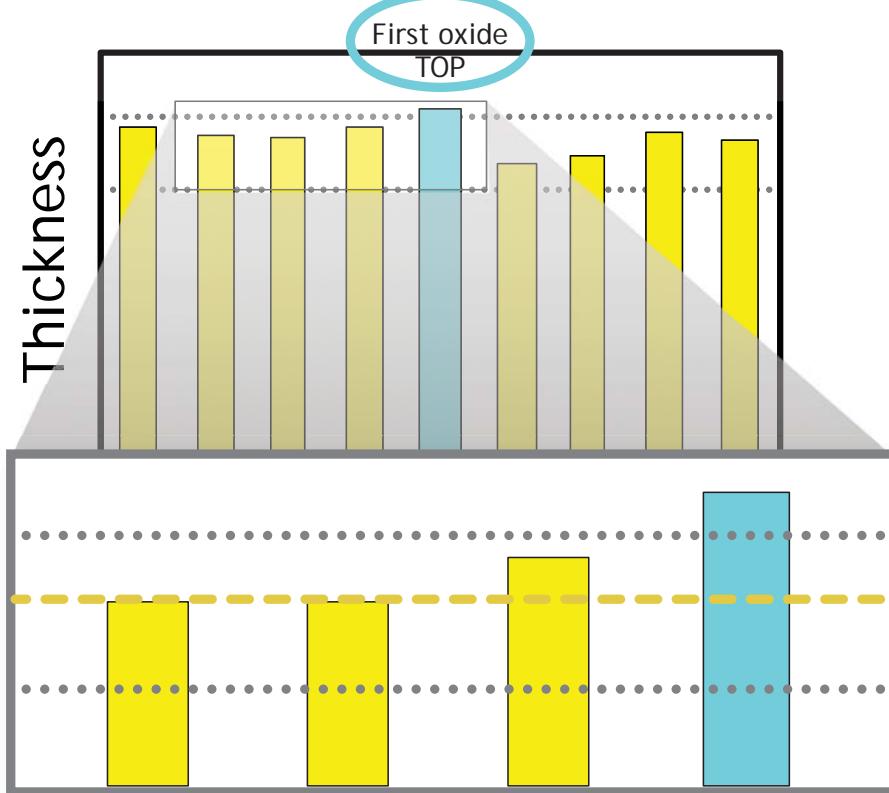
a gate oxide layer which is formed on both side-walls of the Fin active region protruded from said second oxide layer;

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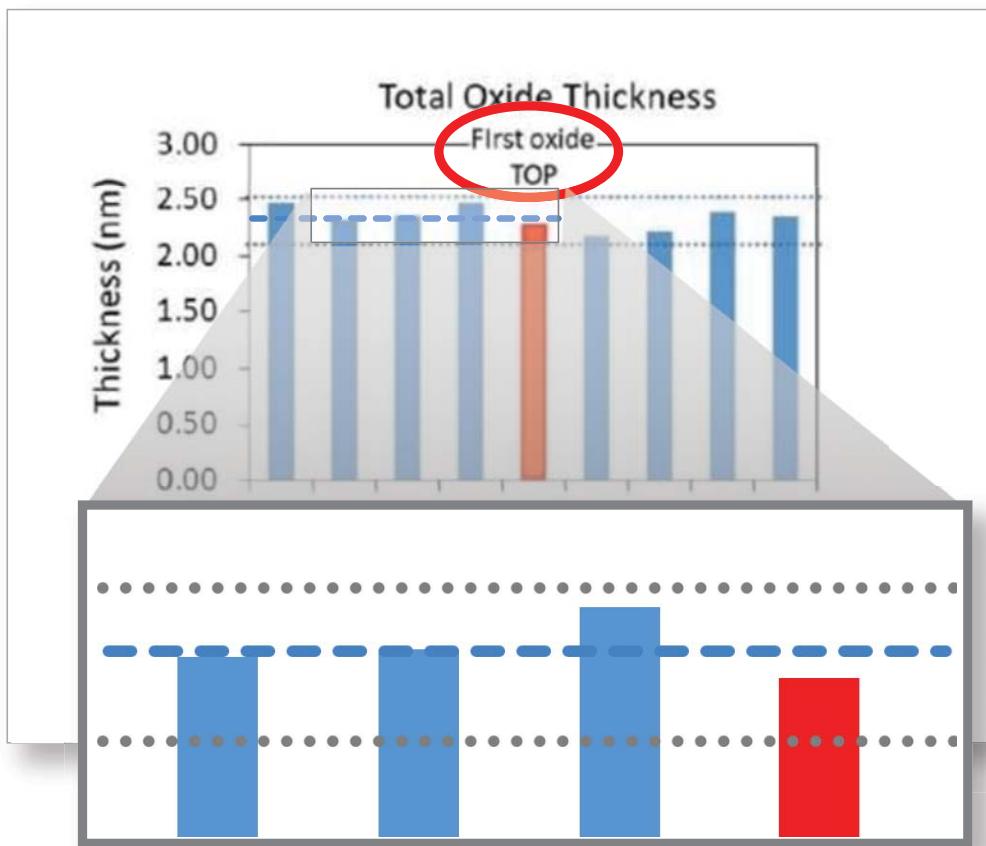


Plaintiff's Own Evidence Shows Accused "first oxide layer" Thickness Is Less Than That of the Accused "gate oxide layer"

All Claims Require
"greater or equal to"



Accused Products Are
"less than"



Kuhn Dem. at 82

Dr. Kuhn Qualified Her Infringement Allegations

Dr. Kuhn



Plaintiff's Expert

Q. And the Defendants' data, their own data actually show this type of equal thickness?

A. Yes. This is the same image I showed before, PX-0843.
... And you can see that there's some manufacturing variation.

...

Q. Now, does this hold true also for just the total thickness of the layer?

A. Yes, it does. Again, I'm showing the same GlobalFoundries picture here except now I've added together the measurements of the thickness of the layers. And you can see it shows the same thing. The -- this thickness would be considered equal with
manufacturing variation.

Plaintiff's Literal Infringement Theory Fails As a Matter of Law



"To establish literal infringement, every limitation set forth in a claim must be found in an accused product, exactly."

Southwall Techs., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1575 (Fed. Cir. 1995)



"[T]here is no indication in the claim that 400 μm was intended to mean anything other than exactly 400 μm . To the contrary, the phrase '400 μm or less' is not qualified by the word 'about' or any other indicator of imprecision."

Takeda Pharm. Co. v. Zydus Pharm. USA, Inc., 743 F.3d 1359, 1363-64 (Fed. Cir. 2014)

- Plaintiff used words of approximation in Claims 11 and 12 ("around"), but not for the relative thickness limitation in Claims 1 and 13

Plaintiff's Literal Infringement Theory Fails As a Matter of Law



"[M]anufacturing tolerances are immaterial to the interpretation of claim language."

Senmed, Inc. v. Richard-Allan Med. Indus., Inc., 888 F.2d 815, 820 n.10 (Fed. Cir. 1989)



"The meaning of patent terms depends on the usage of those terms in context by one of skill in the art at the time of application."

Middleton v. Minnesota Mining and Mfg. Co., 311 F.3d 1384, 1389 (Fed. Cir. 2002)

No Reasonable Jury Could Have Found the Claims Infringed Under DOE

- Plaintiff's DOE theory would vitiate the claimed relative thickness limitation since "less than" is the antithesis of "greater or equal to."



"[I]f a court determines that a finding of infringement under the doctrine of equivalents 'would entirely vitiate a particular claimed element,' then the court should rule that there is no infringement under the doctrine of equivalents."

Lockheed Martin Corp. v. Space Sys./Loral, Inc., 324 F.3d 1308, 1321 (Fed. Cir. 2003) (citation omitted)



"[I]t would defy logic to conclude that a minority—the very antithesis of a majority—could be insubstantially different from a claim limitation requiring a majority, and no reasonable juror could find otherwise."

Moore U.S.A., Inc. v. Standard Register Co., 229 F.3d 1091, 1106 (Fed. Cir. 2000) (emphasis added)

No Reasonable Jury Could Have Found Infringement

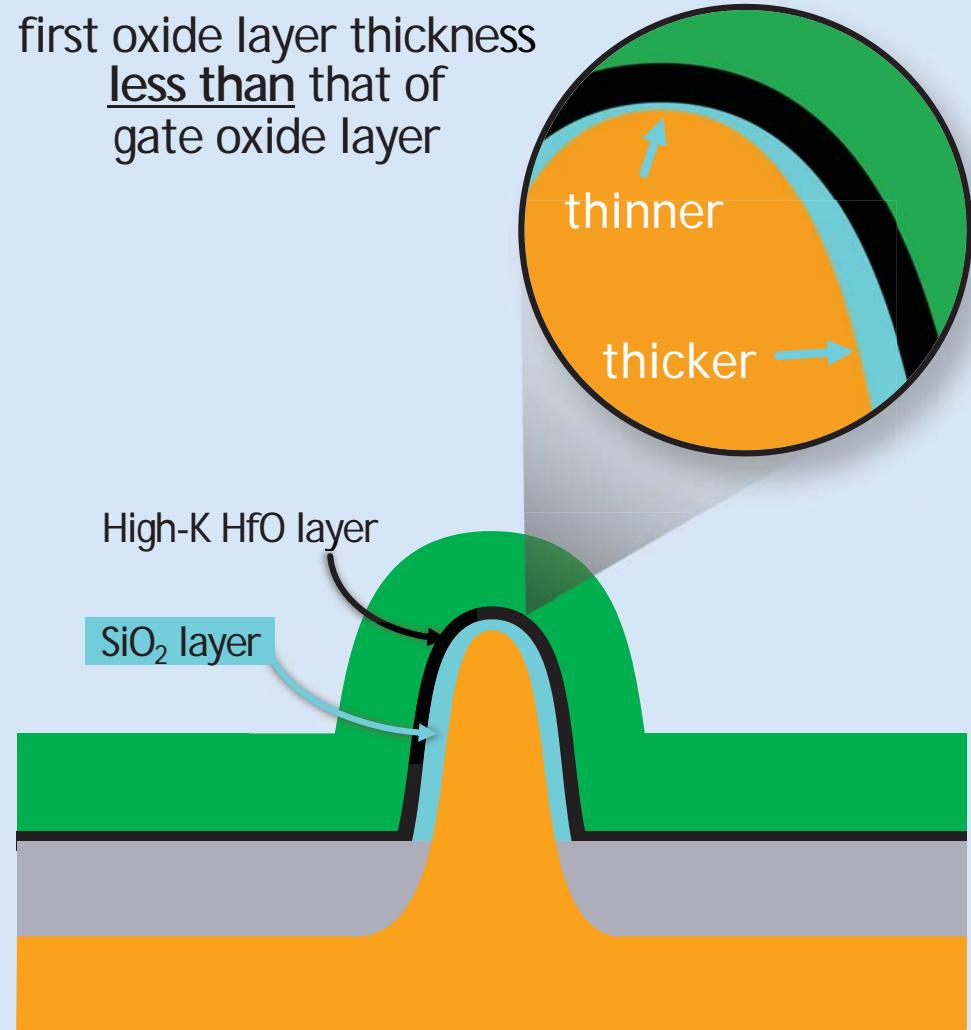
CLAIMS REQUIRE

“Thickness Greater or Equal”

a first oxide layer which is formed on the upper surface of said Fin active region with a thickness greater or equal to that of the gate oxide;

DEFENDANTS HAVE

first oxide layer thickness
less than that of gate oxide layer



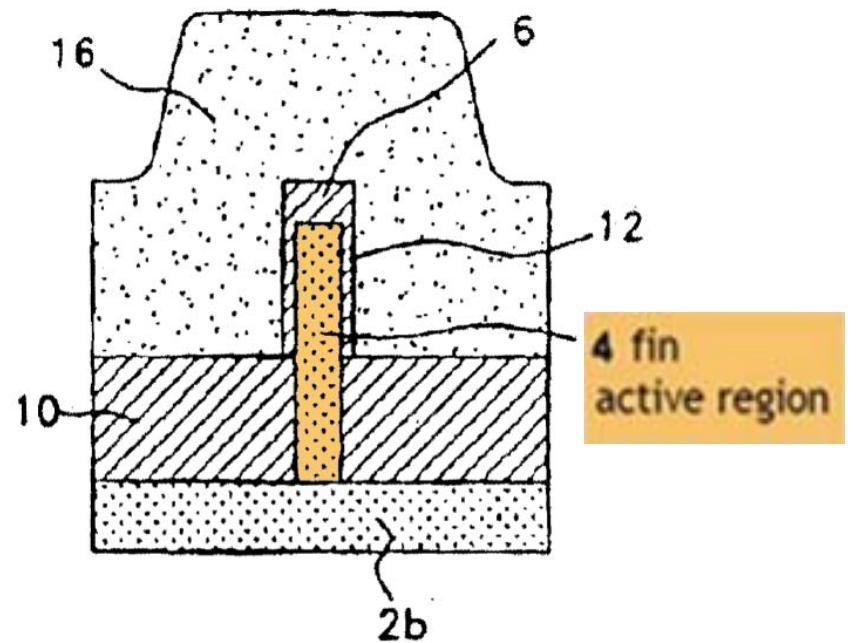
Non-Infringement Ground 4:

Plaintiff failed to prove the accused products have
“a Fin active region which is a wall-shape”

All Claims Require “a Fin active region which is a wall-shape”

“wall-shape”

a Fin active region which is a wall-shape single crystalline silicon on a surface of the bulk silicon substrate and connected to said bulk silicon substrate;



Defendants' Products Do Not Have a "wall-shape" Fin Active Region

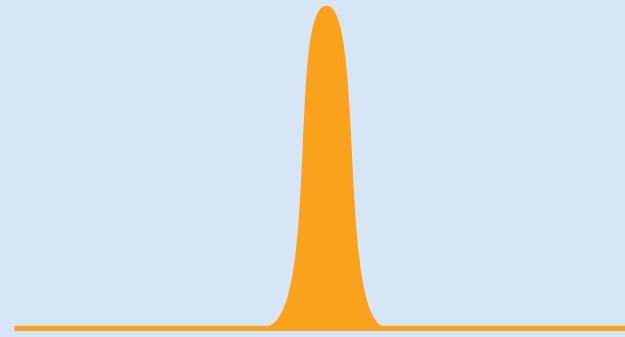
CLAIMS REQUIRE

"wall-shape"

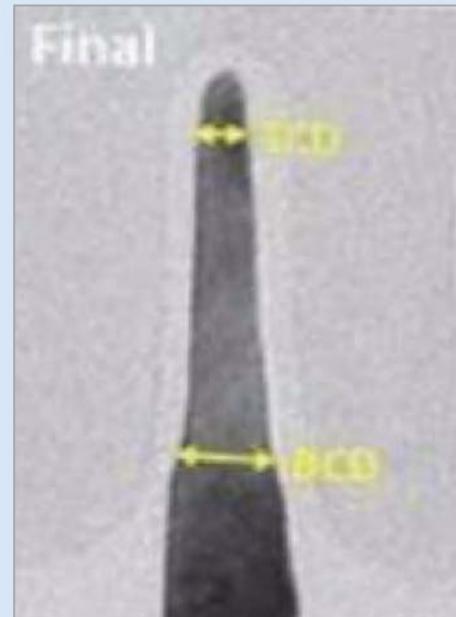
a Fin active region which is a wall-shape single crystalline silicon on a surface of the bulk silicon substrate and connected to said bulk silicon substrate;

DEFENDANTS HAVE

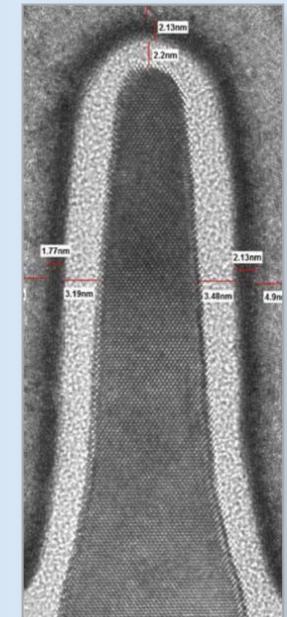
parabola



THE ACCUSED PRODUCTS - THE EVIDENCE



DX316



DX430

Defendants' Fin Has a Parabola Shape

Dr. Subramanian



Defendants' Expert

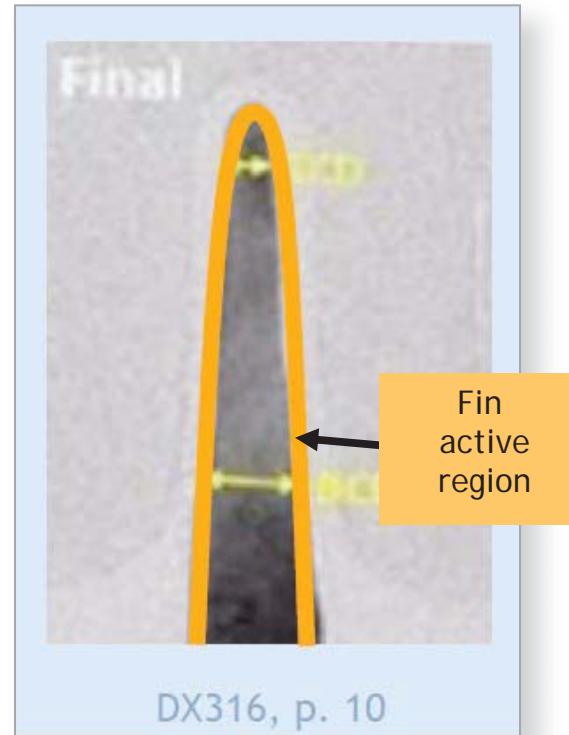
Q. And now this overlay of orange, what does that represent?

A. So the overlay is an actual parabolic curve, so it's a parabola drawn and --- and overlaid over the actual image of the Fin from an accused product. And you can see that the shape matches extremely well. It really is well described as a parabola.

. . .

Q. Now, 'parabola' is a term that's used in geometry, fair?

A. Yes, sir.



Defendants' Fin Has a Parabola Shape

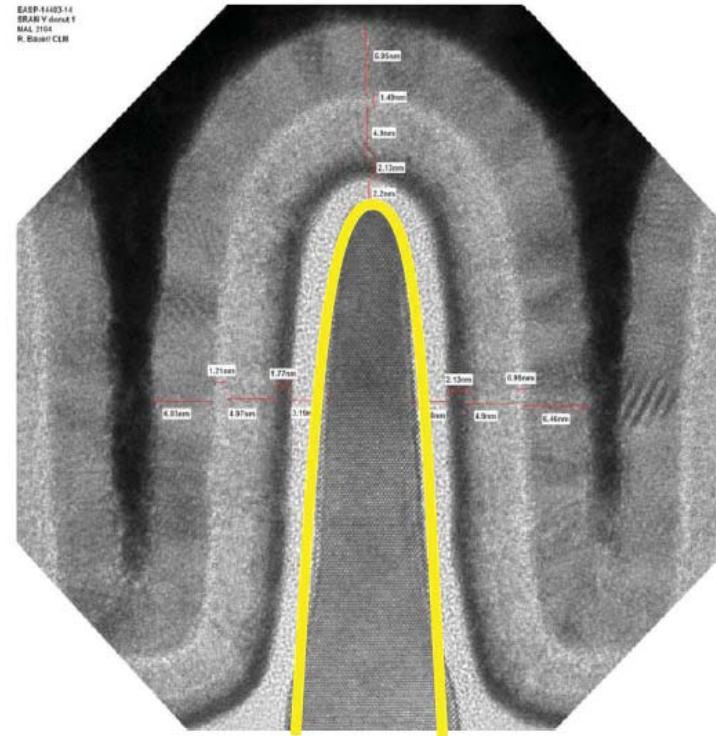
So you can see this picture, and what is drawn here in yellow is the parabola. And the shape of this -- and that parabola is a -- is -- is a -- is a geometric figure that has a continuous curvature right there. It doesn't have corners. It doesn't have flat tops. It has a continuous curvature, and that's what these -- you know, these Fins are.

Dr. Samavedam

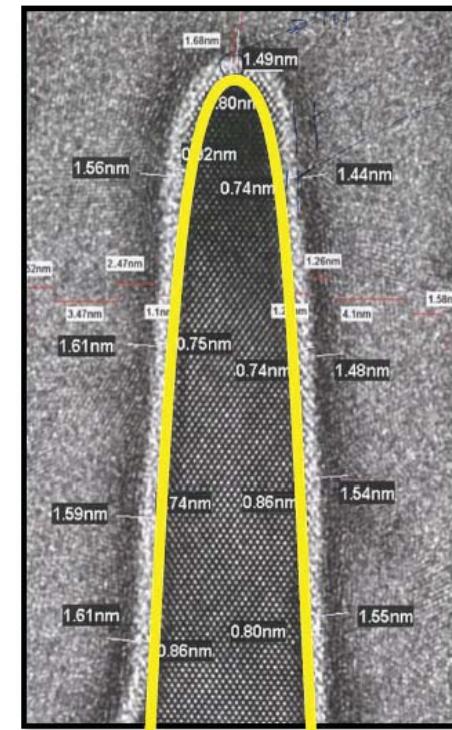


Globalfoundries

Fact Witness



DX430 (I/O Device)



DX427 (Logic Device)

Samavedam Dem. at 7

Plain and Ordinary Meaning of “wall-shape” Connotes Rectilinearity

Dr. Samavedam



Globalfoundries
Fact Witness

Q. Now, let's talk about the shape of the Fin itself. Can you tell us about that?

A. Yeah. You know, the shape of our Fin is not wall-shaped at all. I mean, it has a continuous curvature. It has a curved top. You know, in the semiconductor world when you say wall-shaped, you know, one thinks of rectangular sections, corners, flat surfaces. And our FIN does not have any of those.

Plain and Ordinary Meaning of “wall-shape” Connotes Rectilinearity

Dr. Kuhn



Plaintiff's Expert

Q. Okay. And your understanding wall-shape is it runs through there in a rectilinear manner, right?

A. Yes, sir.

Claims Do Not Deviate From Plain and Ordinary Meaning of “wall-shape” Requiring Two Top Corners

15. The device as claimed in claim 1, wherein the two top corners of said Fin active region are chamfered through an oxidation and etching, or (and) annealing process in a hydrogen atmosphere.

'055 Patent, Claim 15

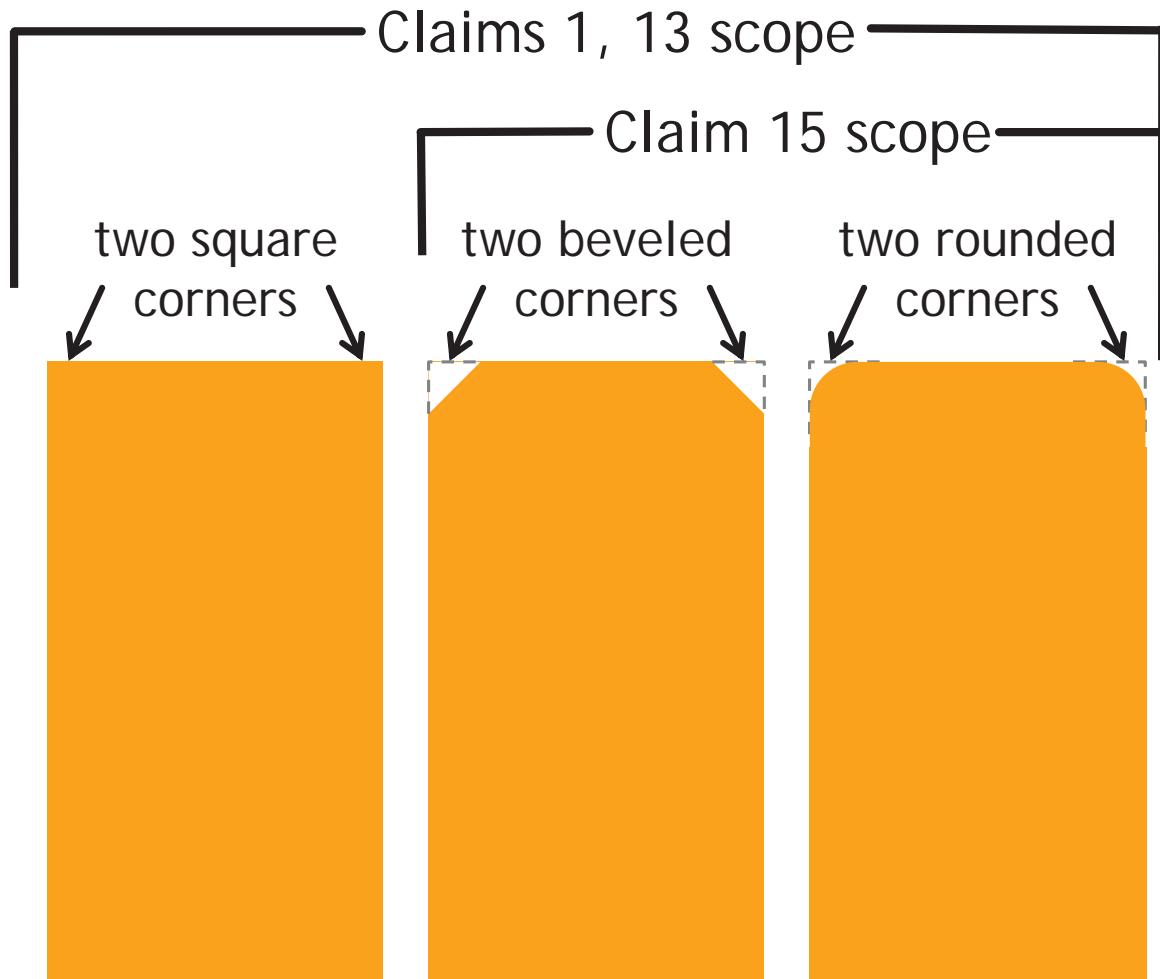
1. A double-gate FinFET device, comprising:
a bulk silicon substrate;
a Fin active region which is a wall-shape single crystalline silicon on a surface of the bulk silicon substrate and connected to said bulk silicon substrate;

'055 Patent, Claim 1 excerpt

Claims Do Not Deviate From Plain and Ordinary Meaning of "wall-shape" Requiring Two Top Corners

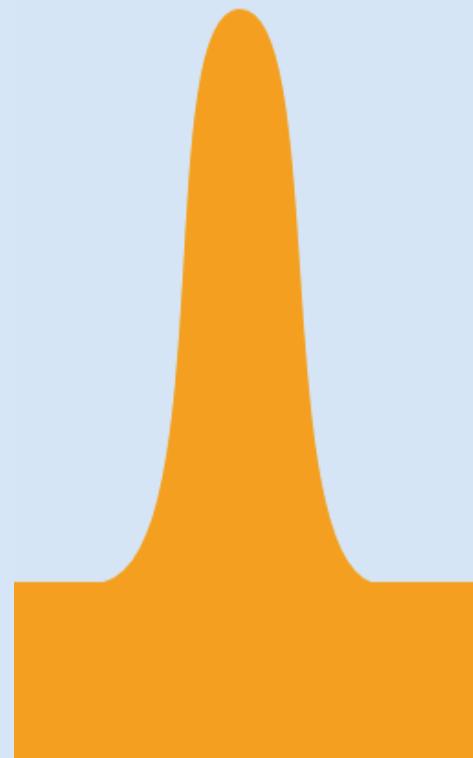
COURT'S CLAIM CONSTRUCTION

"the two top corners ... are chamfered" means
"the two top corners ... are beveled or rounded"



A PARABOLA HAS NO CORNERS AND SO CANNOT MEET THE DEFINITION OF "WALL-SHAPE" FIN

no corners



JMOL Is Warranted As The Accused “Fin” Undisputedly Has No Corners



“Where the parties do not dispute any relevant facts regarding the accused product . . . but disagree over possible claim interpretations, the question of literal infringement collapses into claim construction and is amenable to summary judgment.”

Gen. Mills, Inc. v. Hunt-Wesson, Inc., 103 F.3d 978, 983 (Fed. Cir. 1997)

Dr. Kuhn's Testimony That the Accused Fin Is "wall-shape" Was Conclusory

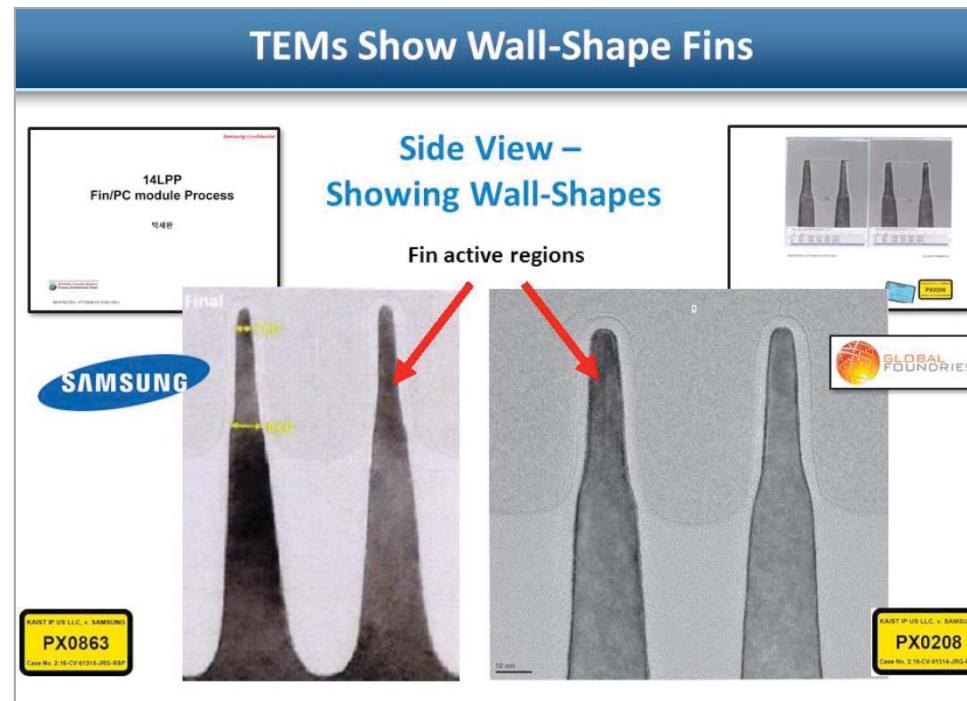
Dr. Kuhn



Plaintiff's Expert

Q. Are there images also from Defendants' own technical documents that show this wall-shape Fin?

A. Yes, there are. And I show here on the left Samsung's documents, PX-0863, and on the right, GlobalFoundries documents, PX-0208. And I'll orient the Fin for the jury. It's right straight at you. And you can see the wall-shape Fin active region there.



Kuhn Dem. at 56

Plaintiff's Literal Infringement Theory Fails As a Matter of Law



"General and conclusory testimony . . . does not suffice as substantial evidence . . ."

Koito Mfg. Co., Ltd. v. Turn-Key-Tech, LLC., 381 F.3d 1142, 1152 (Fed. Cir. 2004)



"[J]ust saying that something is so does not make it true, especially when there is no record support and, in fact, the [evidence] indicates otherwise."

Dominion Energy, Inc. v. Alstom Grid LLC., 725 F. App'x 980, 986 (Fed. Cir. 2018)

Dr. Kuhn's DOE Testimony Assumed the Accused "Fin" Was Wall-Shape

Dr. Kuhn failed to address whether the accused parabolic Fin was insubstantially different from the claimed "wall-shape" Fin:

Dr. Kuhn



Plaintiff's Expert

Q. Now, would this element also be met under the Doctrine of Equivalents?

A. Yes, sir. And under the Doctrine of Equivalents, this element, the wall-shape Fin active region, would provide substantially the same function; that is, providing an increased channel area here along which the gate acts to control the flow of charge carriers. In substantially the same way, a tall narrow channel rising from the plane of the substrate to achieve the same results. And that, of course, is the improved on/off channel characteristics, the improved short channel effects over planar structures.

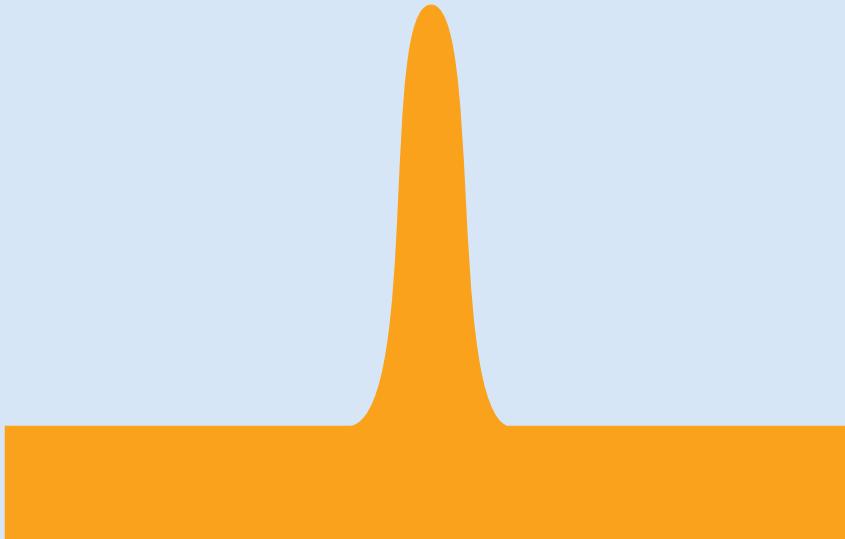
No Reasonable Jury Could Have Found the Claims Infringed Under DOE



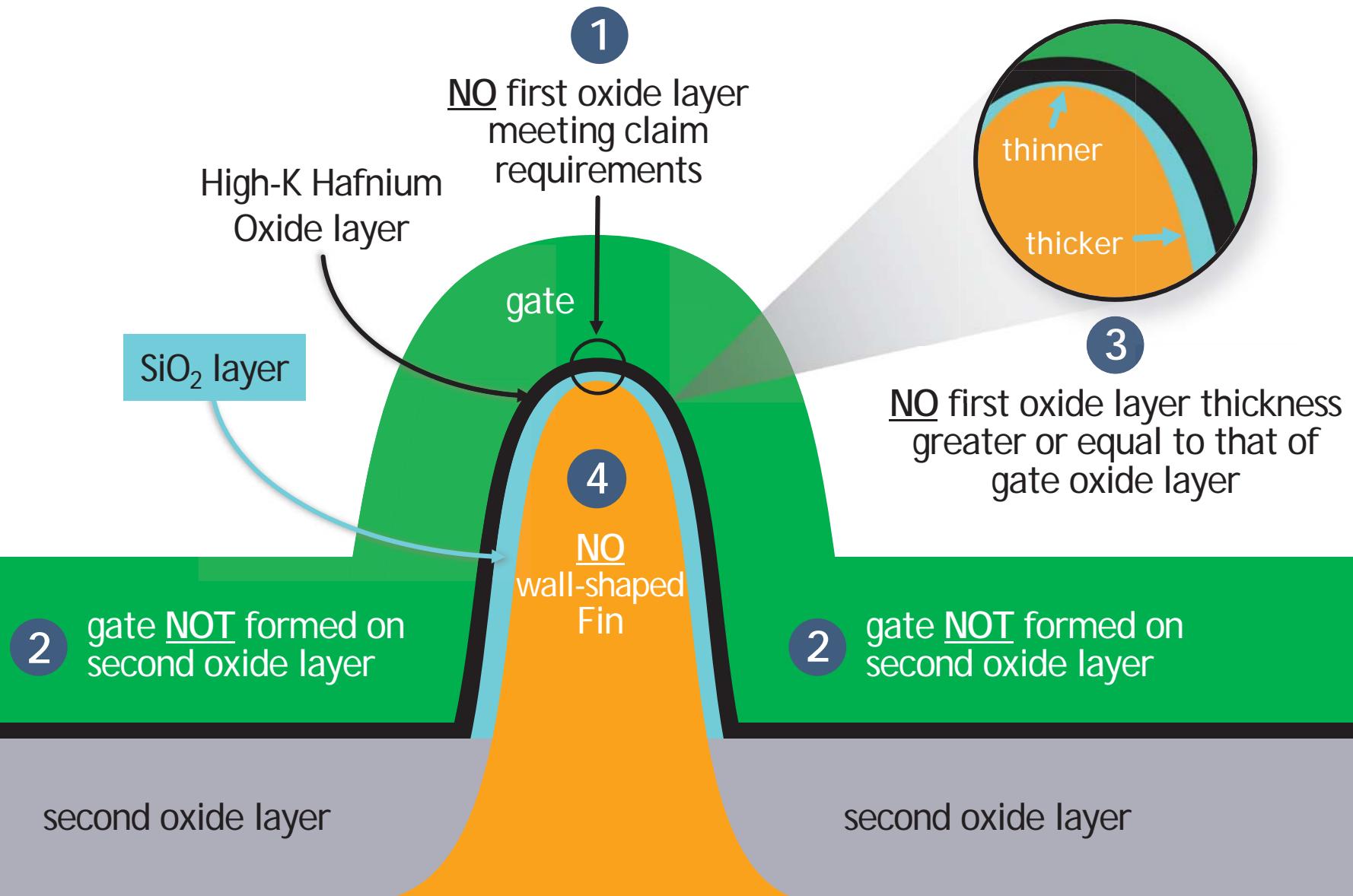
“A plaintiff must provide particularized testimony and linking argument to show the equivalents are insubstantially different. Generalized testimony as to the overall similarity between the claims and the accused infringer's product or process will not suffice.”

Gemalto S.A. v. HTC Corp., 754 F.3d 1364, 1374 (Fed. Cir. 2014)
(internal citations and quotations omitted)

No Reasonable Jury Could Have Found Infringement

CLAIMS REQUIRE	DEFENDANTS HAVE
<p>“wall-shape”</p> <p>a Fin active region which is a wall-shape single crystalline silicon on a surface of the bulk silicon substrate and connected to said bulk silicon substrate;</p>	<p>Fin is parabolic, <u>NOT</u> “wall-shape”</p>  A diagram showing a cross-section of a fin. The fin is a parabolic shape, starting from a wide base and tapering to a sharp peak. It is positioned on top of a larger, solid orange rectangle representing the substrate. The fin itself is also orange.

JMOL of No Infringement Is Required

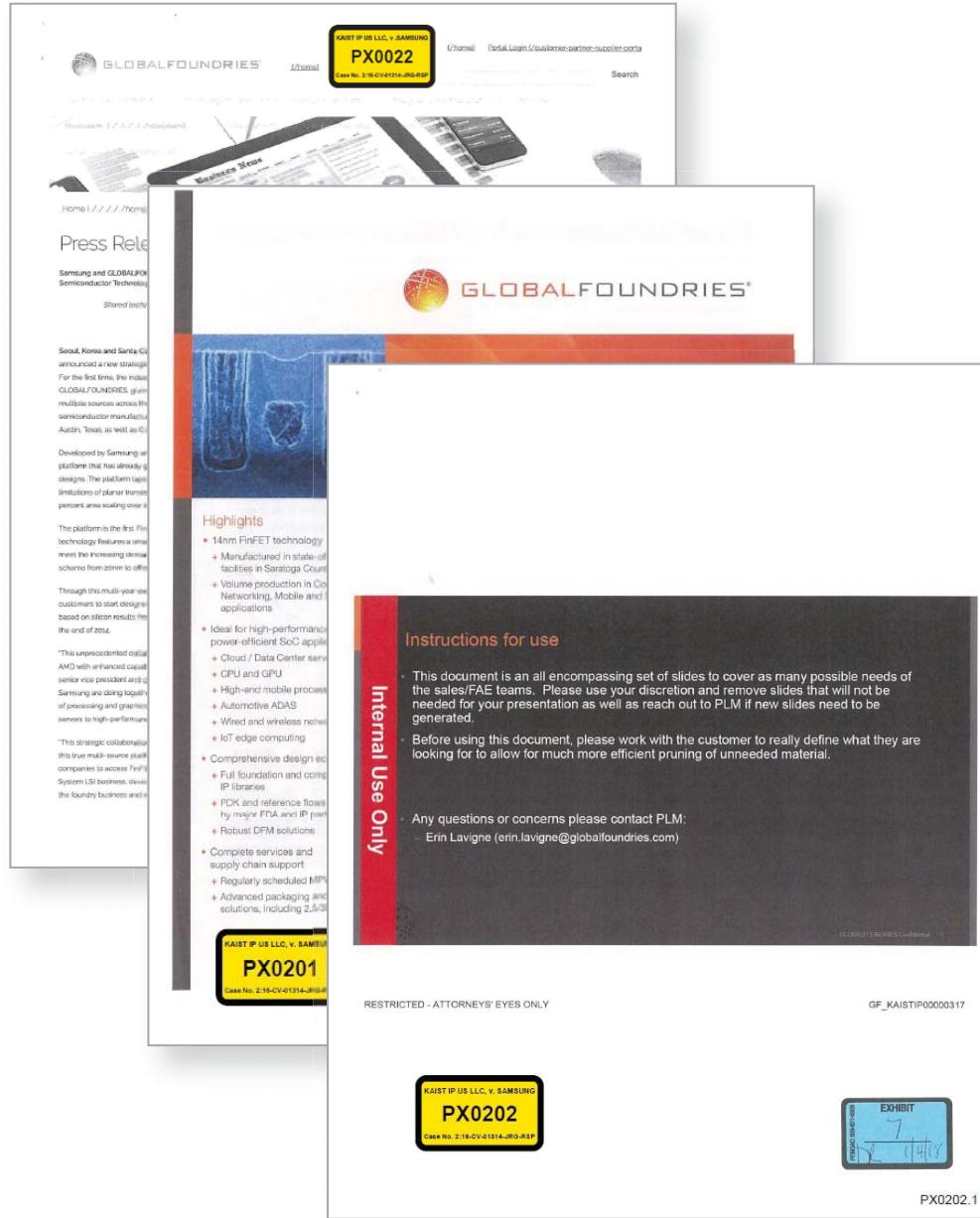


The Parent Holding Company,
Globalfoundries, Inc. (GFI), Is Entitled
to JMOL of Non-Infringement

Plaintiff's Theory Sought to Hold GFI Liable For Its Own Infringing Conduct, Not For a Disregard of the Corporate Form

KAIST IP US did not seek liability based on piercing the corporate veil. It sought to hold GFI liable for its own infringing conduct. Dkt. 323, at 4 (“Contentions of KAIST IP US”). Dr.

The Press Release and Marketing Materials Are Not Offers For Sale, Nor Specific to GFI



- Not offers for sale, as they do not state necessary price and other terms for acceptance.

MEMC Elec. Materials, Inc. v. Mitsubishi Materials Silicon Corp., 420 F.3d 1369, 1376 (Fed. Cir. 2005).

- No distinction between GFI and GlobalFoundries U.S.

GFI Witness Testimony Merely Suggests Use of the GLOBALFOUNDRIES Trademark, Not Any Individualized Act of Infringement After Date of Alleged Infringement

Mr. Abzug



Globalfoundries
Fact Witness

Q. And so the trademark rights at issue in Exhibits 8 and 9, they would be based on using commerce in the U.S., correct?

A. Correct.

Q. And that would be for GlobalFoundries, Inc., correct?

A. I'm hesitating because some of the use may have been on behalf of GlobalFoundries U.S., as well.

Q. So you say some of the use may have been on behalf of GlobalFoundries U.S.?

A. Yes. And not only GlobalFoundries, Inc.

Dr. Kuhn Likewise Did Not Differentiate Between GFI and GlobalFoundries U.S.

Dr. Kuhn



Plaintiff's Expert

Q. Dr. Kuhn, would you briefly describe the type of technology that's at issue in this case?

A. Yes, we're talking about transistors, and we're talking about a specific kind of transistor that's called a planar transistor.... And so these transistors end up in what's called chips, and there's an example here of a chip. And there's one up here of a chip. And then these chips get put in products, such as these here. So inside every iPad and cell phone and laptop and tablet you have, there's chips, and inside those chips are those little transistors.

Q. Now, is there a difference among the companies that make and sell these kinds of devices?

A. Yes, there's three kinds of companies in this business.

. . .

Then there's companies that are the reverse of that, and GlobalFoundries is an example. GlobalFoundries doesn't design chips at all. It just makes them. And it makes them for companies like Qualcomm. So Qualcomm is a designer, and GlobalFoundries is a foundry. Each one does the opposite thing.

Uncontroverted Evidence Confirms No Individualized Acts of Infringement by GFI

- GFI did not engage in any “operational activities.”

See Trial Testimony on 6/13/18 AM at 77:7-9, 79:16-19.

- GFI “has had no part in the manufacture, marketing, advertisement, importation, offer for sale or sale of FinFET devices.”

See Trial Testimony on 6/13/18 AM at 79:1-11.

Conclusion